General Electric Company

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Statistics:
Public Company
Incorporated: 1892
Employees: 305,000
Sales: $134.19 billion (2003)
Stock Exchanges: New York Boston London Euronext Paris
Ticker Symbol: GE
NAIC: 325211 Plastics Material & Resin Manuf.; 325413 In-Vitro Diagnostic Substance Manuf.; 333415 Air-Conditioning & Warm Air Heating Equip. & Comm. & Industrial Refrigeration Equip. Manuf.; 333611 Turbine & Turbine Generator Set Units Manuf.; 334510 Electromedical & Electrotherapeutic Apparatus Manuf.; 334512 Automatic Environ. Control Manuf. for Residential, Comm., & Appl. Use; 334515 Instrument Manuf. for Measuring & Testing Electricity & Electrical Signals; 335110 Electric Lamp Bulb & Part Manuf.; 335121 Residential Electric Lighting Fixture Manuf.; 335122 Comm., Industrial, & Institutional Electric Lighting Fixture Manuf.; 335221 Household Cooking Appl. Manuf.; 335222 Household Refrig. & Home Freezer Manuf.; 335224 Household Laundry Equip. Manuf.; 335228 Other Major Household Appl. Manuf.; 335311 Power, Distribution, & Specialty Transformer Manuf.; 335312 Motor & Generator Manuf.; 335313 Switchgear & Switchboard Apparatus Manuf.; 335931 Current-Carrying Wiring Device Manuf.; 336321 Vehicular Lighting Equip. Manuf.; 336412 Aircraft Engines & Engine Parts Manuf.; 336510 Railroad Rolling Stock Manuf.; 512110 Motion Picture & Video Prod.; 512120 Motion Picture & Video Distribution; 515120 Television Broadcasting; 515210 Cable & Other Subscription Programming; 522110 Comm. Banking; 522210 Credit Card Issuing; 522220 Sales Financing; 522291 Consumer Lending; 522292 Real Estate Credit; 524130 Reinsurance Carriers; 532411 Comm. Air, Rail, & Water Trans. Equip. Rental & Leasing; 532420 Office Machinery & Equip. Rental & Leasing; 532490 Other Comm. & Industrial Machinery & Equip. Rental & Leasing; 541710 Research & Development in the Physical, Engineering, & Life

Sciences; 713110 Amusement & Theme Parks

Company Perspectives:
GE has always been a multi-business company. Over the past 125 years, GE has swiftly evolved to seize new opportunities created by changes in technology and the economy. Today GE is building new platforms in industries and markets with above-GDP growth that provide opportunities to apply GE technology and management expertise to accelerate that growth.

Key Dates:
1878: Thomas Edison establishes the Edison Electric Light Company.
1889: Edison has, by this date, consolidated all of his companies under the name of the Edison General Electric Company.
1892: Edison's company merges with the Thomson-Houston Electric Company to form General Electric Company (GE); company's stock begins trading on the New York Stock Exchange.
1894: Edison sells all his shares in the company, remaining a consultant to GE.
1900: GE establishes the first industrial laboratory in the United States.
1903: Stanley Electric Manufacturing Company of Pittsfield, Massachusetts, a manufacturer of transformers, is acquired.
1906: The first GE major appliance, an electric range, is introduced.
1918: GE merges with Pacific Electric Heating Company, maker of the Hotpoint iron, and Hughes Electric Heating Company, maker of an electric range; company forms Edison Electric Appliance Company to sell products under the GE and Hotpoint brands.
1919: GE, AT&T, and Westinghouse form the Radio Corporation of America (RCA) to develop radio technology.
1924: GE exits from the utilities business following government antitrust action.
1930: Company sells its holdings in RCA because of antitrust considerations.
1938: GE introduces the fluorescent lamp.
1943: General Electric Capital Corporation is established.
1949: Under antitrust pressure, the company is forced to release its light bulb patents to other companies.
1955: The U.S. Navy launches the submarine *Seawolf,* which is powered by a GE nuclear reactor.
1957: GE receives a license from the Atomic Energy Commission to operate a nuclear power plant; an enormous appliance manufacturing site, Appliance Park, in Louisville, Kentucky, is completed.
1961: The company pleads guilty to price fixing on electrical equipment and is fined nearly half a million dollars.
1976: GE spends $2.2 billion to acquire Utah International, a major coal, copper, uranium, and iron miner and a producer of natural gas and oil.
1981: John F. (Jack) Welch, Jr., becomes chairman and CEO.
1986: Company acquires RCA, which includes the National Broadcasting Company (NBC), for $6.4 billion; Employers Reinsurance is also acquired for $1.1 billion, as well as an 80 percent stake in Kidder Peabody.
1987: GE sells its own and RCA's television manufacturing businesses to the French company Thomson in exchange for Thomson's medical diagnostics business.
1994: Company liquidates Kidder Peabody.
1998: Revenues surpass $100 billion.
2000: GE announces a $45 billion deal to take over Honeywell International Inc.
2001: Honeywell deal is blocked by European Commission; Welch retires and is succeeded by Jeffrey R. Immelt; Heller Financial Inc., a global commercial finance company, is acquired for $5.3 billion.
2002: NBC acquires Telemundo Communications Group Inc.
2004: British health sciences firm Amersham plc is acquired for $9.5 billion; in $14 billion deal, GE buys Vivendi Universal Entertainment, which is combined with NBC to form NBC Universal.

Company History:

The history of General Electric Company is a significant part of the history of technology in the United States. General Electric (GE) has evolved from Thomas Edison's home laboratory into one of the largest companies in the world, following the evolution of electrical technology from the simplest early applications into the high-tech wizardry of the early 21st century. The company has also evolved into a conglomerate, with an increasing shift from

technology to services, and with 11 main operating units: GE Advanced Materials, a specialist in high-performance engineered thermoplastics, silicon-based products, and fused quartz and ceramics used in a wide variety of industries; GE Consumer & Industrial, which is one of the world's leading appliance manufacturers, stands as a preeminent global maker of lighting products for consumer, commercial, and industrial customers, and also provides integrated industrial equipment, systems, and services; GE Energy, one of the largest technology suppliers to the energy industry; GE Equipment Services, which offers leases, loans, and other services to medium and large businesses around the world to help them manage their business equipment; GE Healthcare, a world leader in medical diagnostic and interventional imaging technology and services; GE Infrastructure, which is involved in high-technology protective and productivity solutions in such areas as water purification, facility safety, plant automation, and automatic environmental controls; GE Transportation, the largest producer of small and large jet engines for commercial and military aircraft in the world, as well as the number one maker of diesel freight locomotives in North America; NBC Universal (80 percent owned by GE), a global media and entertainment giant with a wide range of assets, including the NBC and Telemundo television networks, several cable channels, and the Universal Pictures film studio; GE Commercial Finance, which provides businesses, particularly in the mid-market segment, with an array of financial services and products, including loans, operating leases, and financing programs; GE Consumer Finance, a leading financial services provider, serving consumers, retailers, and auto dealer in about three dozen countries; and GE Insurance, which is involved in such areas as life insurance, asset management, mortgage insurance, and reinsurance. The staggering size of General Electric, which ranked fifth in the *Fortune* 500 in 2003, becomes even more evident through the revelation that each of the company's 11 operating units, if listed separately, would qualify as a *Fortune* 500 company. GE operates in more than 100 countries worldwide and generates approximately 45 percent of its revenues outside the United States. Over the course of its 110-plus years of innovation, General Electric has amassed more than 67,500 patents, and the firm's scientists have been awarded two Nobel Prizes and numerous other honors.

Late 19th Century: The Edison Era

Thomas Edison established himself in the 1870s as an inventor after devising, at the age of 23, an improved stock ticker. He subsequently began research on an electric light as a replacement for gas light, the standard method of illumination at the time. In 1876 Edison moved into a laboratory in Menlo Park, New Jersey. Two years later, in 1878, Edison established, with the help of his friend Grosvenor Lowry, the Edison Electric Light Company with a capitalization of $300,000. Edison received half of the new company's shares on the agreement that he work on developing an incandescent lighting system. The major problem Edison and his team of specialists faced was finding an easy-to-produce filament that would resist the passage of electrical current in the bulb for a long time. He triumphed only a year after beginning research when he discovered that common sewing thread, once carbonized, worked in the laboratory. For practical applications, however, he switched to carbonized bamboo.

Developing an electrical lighting system for a whole community involved more than merely developing an electric bulb; the devices that generated, transmitted, and controlled electric power also had to be invented. Accordingly, Edison organized research into all of these areas and in 1879, the same year that he produced an electric bulb, he also constructed the first dynamo, or direct-current (DC) generator.

The original application of electric lighting was on the steamship *Columbia* in 1880. In that same year, Edison constructed a three-mile-long trial electric railroad at his Menlo Park laboratory. The first individual system of electric lighting came in 1881, in a printing plant. But the first full-scale public application of the Edison lighting system was actually made in London, at the Holborn Viaduct. The first system in the United States came soon after when Pearl Street Station was opened in New York City. Components of the system were manufactured by different companies, some of which were organized by Edison; lamps came from the parent company, dynamos from the Edison Machine Works, and switches from Bergmann & Company of New York. In 1886 the Edison Machine Works was moved from New Jersey to Schenectady, New York.

While these developments unfolded at Edison's company, the Thomson-Houston Company was formed from the American Electric Company, founded by Elihu Thomson and Edwin Houston, who held several patents for their development of arc lighting. Some of their electrical systems differed from Edison's through the use of alternating-current (AC) equipment, which can transmit over longer distances than DC systems. By the early 1890s the spread of electrification was threatened by the conflict between the two technologies and by patent deadlocks, which prevented further developments because of patent-infringement problems.

By 1889, Edison had consolidated all of his companies under the name of Edison General Electric Company. Three years later, in 1892, this company was merged with the Thomson-Houston Electric Company to form the General Electric Company. Although this merger was the turning point in the electrification of the United States, it resulted in Edison's resignation from GE. He had been appointed to the board of directors but he attended only one board meeting, and sold all of his shares in 1894, though he remained a consultant to General Electric and continued to collect royalties on his patents. The president of the new company was Charles A. Coffin, a former shoe manufacturer who had been the leading figure at Thomson-Houston. Coffin remained president of General Electric until 1913, and was chairman thereafter until 1922. Meanwhile, also in 1892, GE's stock began trading on the New York Stock Exchange.

In 1884 Frank Julian Sprague, an engineer who had worked on electric systems with Edison, resigned and formed the Sprague Electric Railway and Motor Company, which built the first large-scale electric streetcar system in the United States, in Richmond, Virginia. In 1889 Sprague's company was purchased by Edison's. In the meantime, the two other major electric-railway companies in the United States had merged with Thomson-Houston, so that by the time General Electric was formed, it was the major supplier of electrified railway systems in the United States.

One year after the formation of General Electric, the company won a bid for the construction of large AC motors in a textile mill in South Carolina. The motors were the largest manufactured by General Electric at the time and were so successful that orders soon began to flow in from other industries such as cement, paper, and steel. In that same year, General Electric began its first venture into the field of power transmission with the opening of the Redlands-Mill Creek power line in California, and in 1894 the company constructed a massive power-transmission line at Niagara Falls. Meanwhile the company's electric-railroad ventures produced an elevated electric train surrounding the fairgrounds of the Chicago World's Fair in 1893. Electrification of existing rail lines began two years later.

Early 20th Century: Bolstering Electrification Operations and Moving Beyond Them

By the turn of the century General Electric was manufacturing everything involved in the electrification of the United States: generators to produce electricity, transmission equipment to carry power, industrial electric motors, electric light bulbs, and electric locomotives. It is important to any understanding of the evolution of GE to realize that though it was diverse from the beginning, all of its enterprises centered on the electrification program. It is also worth noting that it operated in the virtual absence of competition. General Electric and the Westinghouse Electric Company had been competitors, but the companies entered into a patent pool in 1896.

In 1900 GE established the first industrial laboratory in the United States. Up to that point, research had been carried out in universities or in private laboratories similar to Edison's Menlo Park laboratory. Initially, the lab was set up in a barn behind the house of one of the researchers, but the lab was moved in 1900 to Schenectady, New York, after it was destroyed in a fire. The head of the research division was a professor from the Massachusetts Institute of Technology. The importance of research at General Electric cannot be underestimated, for GE has been awarded more patents over the years than any other company in the United States.

During the early decades of the 20th century General Electric made further progress in its established fields and also made its first major diversification. In 1903 General Electric bought the Stanley Electric Manufacturing Company of Pittsfield, Massachusetts, a manufacturer of transformers. Its founder, William Stanley, was the developer of the transformer.

By this time GE's first light bulbs were in obvious need of improvement. Edison's bamboo filament was replaced in 1904 by metalized carbon developed by the company's research lab. That filament, in turn, was replaced several years later by a tungsten-filament light bulb when William Coolidge, a GE researcher, discovered a process to render the durable metal more pliable. This light bulb was so rugged and well suited for use in automobiles, railroad cars, and street cars that it was still employed in the early 2000s. In 1913, two other innovations came out of the GE labs: Irving Langmuir discovered that gas-filled bulbs were more efficient and reduced bulb blackening. To this day virtually all bulbs over 40 watts are gas-filled.

The first high-vacuum, hot-cathode X-ray tube, known as the Coolidge tube, was also developed in 1913. Coolidge's research into tungsten had played an important role in the development of the X-ray tube. The device, which combined a vacuum with a heated tungsten filament and tungsten target, has been the foundation of virtually all X-ray tubes produced ever since, and its development laid the foundation for medical technology operations at General

Electric.

Perhaps GE's most important development in the early part of this century was its participation in the development of the high-speed steam turbine in conjunction with English, Swedish, and other inventors. Until this invention, all electricity (except hydroelectric) had been produced by generators that turned at no more than 100 rpm, which limited the amount of electricity a single unit could produce. An independent inventor had come up with a design for a very-high-speed steam turbine before the turn of the century, but it took five years of research before GE could construct a working model. By 1901, however, a 500-kilowatt, 1,200-rpm turbine generator was operating. Orders for the turbines followed almost immediately, and by 1903 a 5,000-kilowatt turbine was in use at Chicago's Commonwealth Edison power company.

Such rapid progress led to rapid obsolescence as well, and the Chicago units were replaced within six years. As a result, GE shops in Schenectady were soon overflowing with business. By 1910 the volume of the company's trade in turbine generators had tripled and GE had sold almost one million kilowatts of power capacity. At the same time, General Electric scientists were also researching the gas turbine. Their investigations eventually resulted in the first flight of an airplane equipped with a turbine-powered supercharger.

In the early days of electric power, electricity was produced only during evening hours, because electric lighting was not needed during the day and there were no other products to use electricity. GE, as the producer of both electricity-generating equipment and electricity-consuming devices, naturally sought to expand both ends of its markets. The first major expansion of the General Electric product line was made in the first decade of the 20th century. Before the turn of the century, light bulbs and electric fans were GE's only consumer product. One of the first household appliances GE began to market was a toaster in 1905. The following year the company attempted to market an electric range. The unwieldy device consisted of a wooden table top equipped with electric griddles, pans, toasters, waffle irons, pots, and a coffeemaker, each with its own retractable cord to go into any one of 30 plugs. The range was followed by a commercial electric refrigerator in 1911 and by an experimental household refrigerator six years later.

At the same time two other companies in the United States were producing electric devices for the home. The Pacific Electric Heating Company produced the first electric appliance to be readily accepted by the public: the Hotpoint iron. The Hughes Electric Heating Company produced and marketed an electric range. In 1918 all three companies were prospering, but to avoid competition with one another, they agreed upon a merger. The new company combined GE's heating-device section with Hughes and Pacific to form the Edison Electric Appliance Company, whose products bore either the GE or the Hotpoint label.

GE's first diversification outside electricity came with its establishment of a research staff to investigate plastics. This occurred primarily at the prompting of Charles P. Steinmetz, a brilliant mathematician who had been with the company since the 1890s. All of the initial work by this group was devoted to coatings, varnishes, insulation, and other products related to electrical wiring, so that even this diversification was tied in to electrification.

A more radical branching of GE's activities occurred in 1912, when Ernst Alexanderson, a GE employee, was approached by a radio pioneer looking for a way to expand the range of wireless sets into higher frequencies. Alexanderson worked for almost a decade on the project before he succeeded in creating electromagnetic waves that could span continents, instead of the short distances to which radios had been limited. In 1922, General Electric introduced its own radio station, WGY, in Schenectady. In 1919, at the request of the government, GE formed, in partnership with AT&T and Westinghouse, the Radio Corporation of America (RCA) to develop radio technology. GE withdrew from the venture in 1930, when antitrust considerations came to the fore. General Electric also operated two experimental shortwave stations that had a global range.

Other developments at General Electric contributed to the progress of the radio. Irving Langmuir had developed the electron tube. This tube, necessary for amplifying the signals in Alexanderson's radio unit, was capable of operating at very high power. Other important developments by scientists at General Electric included the world's first practical loudspeaker and a method for recording complex sound on film that is still in use today.

Developments continued apace at GE in the electric motor field. In 1913 the U.S. Navy commissioned General Electric to build the first ship to be powered by turbine motors rather than steam. In 1915 the first turbine-propelled battleship sailed forth, and within a few years, all of the Navy's large ships were equipped with electric power.

General Electric also owned several utility companies that generated electrical power, but in 1924 GE left the utilities business when the federal government brought antitrust action against the company.

During the Great Depression the company introduced a variety of consumer items such as mixers, vacuum cleaners, air conditioners, and washing machines. GE also introduced the first affordable electric refrigerator in the late 1920s. It was designed by a Danish toolmaker, Christian Steenstrup, who later supervised mechanical research at the GE plant in Schenectady. In addition, GE introduced its first electric dishwasher in 1932, the same year that consumer financing of personal appliances was introduced.

Also in 1932 the first Nobel Prize ever awarded to a scientist not affiliated with a university went to Irving Langmuir for his work at GE on surface chemistry, research that had grown out of his earlier work on electron tubes. The years that followed witnessed a steady stream of innovation in electronics from the GE labs. These included the photoelectric-relay principle, rectifier tubes that eliminated batteries from home receivers, the cathode-ray tube, and glass-to-metal seals for vacuum tubes. Many of these developments in electronics were crucial to the growth of radio broadcasting.

The broadcasting division of General Electric achieved a breakthrough in the late 1930s. The company had been developing a mode of transmission known as frequency modulation (FM) as an alternative to the prevailing amplitude modulation (AM). In 1939 a demonstration conducted for the Federal Communications Commission proved that FM had less static and noise. GE began broadcasting in FM the following year.

Of course, the light bulb was not forgotten in this broadening of research activity at General Electric. The world's first mercury-vapor lamp was introduced in 1934, followed four years later by the fluorescent lamp. The latter produced light using half the power of incandescent bulbs, with about twice the lifespan. Less than a year after the introduction of the fluorescent light, General Electric introduced the sealed-beam automotive headlight.

Even though production of convenience items for the consumer halted during World War II, the war proved profitable for General Electric, whose revenues quadrupled during the war. The president of General Electric at the time, Charles Wilson, joined the War Production Board in 1942. GE produced more than 50 different types of radar for the armed forces and over 1,500 marine power plants for the Navy and merchant marine. The company, using technology developed by the Englishman Frank Whittle, also conducted research on jet engines for aircraft. The Bell XP-59, the first U.S. jet aircraft, flew in 1942 powered by General Electric engines. By the end of the war this technology helped General Electric develop the nation's first turboprop engine.

Postwar Growth and Difficulties

When production of consumer goods resumed immediately after the war, GE promptly found itself in another antitrust battle. The government discovered that GE controlled 85 percent of the light bulb industry--55 percent through its own output and the other 30 percent through licensees. In 1949 the court forced GE to release its patents to other companies.

In this period the first true product diversifications came out of GE's research labs. In the 1940s a GE scientist discovered a way to produce large quantities of silicone, a material GE had been investigating for a long time. In 1947 GE opened a plant to produce silicones, which allowed the introduction of many products using silicone as a sealant or lubricant.

Meanwhile, as research innovation blossomed and postwar business boomed, the company began an employee relations policy known as "Boulwarism," from Lemuel Boulware, the manager who established the policy. The policy, which eliminated much of the bargaining involved in labor-management relations, included the extension by GE to union leaders of a nonnegotiable contract offer.

During the late 1940s General Electric embarked on a study of nuclear power and constructed a laboratory specifically for the task. Company scientists involved in an earlier attempt to separate U-235 from natural uranium were developing nuclear power plants for naval propulsion by 1946. In 1955 the Navy launched the submarine *Seawolf*, the world's first nuclear-powered vessel, with a reactor developed by General Electric. In 1957 the company received a license from the Atomic Energy Commission to operate a nuclear-power reactor, the first license granted in the United States for a privately owned generating station. That same year GE's consumer

bought 338 businesses and product lines for $11.1 billion and sold 232 for $5.9 billion. But Welch's first order of business was to return much of the control of the company to the periphery. Although he decentralized management, he retained predecessor Reginald Jones's system of classifying divisions according to their performance. His goal was to make GE number one or two in every field of operation.

One branch of GE's operations that came into its own during this period was the General Electric Credit Corporation, founded in 1943. Between 1979 and 1984, its assets doubled, to $16 billion, primarily because of expansion into such markets as the leasing and selling of heavy industrial goods, inventories, real estate, and insurance. In addition, the leasing operations provided the parent company with tax shelters from accelerated depreciation on equipment developed by GE and then leased by the credit corporation.

Factory automation became a major activity at GE during the early 1980s. GE's acquisitions of Calma and Intersil were essential to this program. In addition, GE entered into an agreement with Japan's Hitachi, Ltd. to manufacture and market Hitachi's industrial robots in the United States. GE itself spent $300 million to robotize its locomotive plant in Erie, Pennsylvania. Two years later GE's aircraft engine business also participated in an air force plant-modernization program and GE later manufactured the engines for the controversial B-1B bomber.

In 1986 General Electric made several extremely important purchases. The largest--in fact, the largest for the company to that date--was the $6.4 billion purchase of the Radio Corporation of American (RCA), the company GE had helped to found in 1919. RCA's National Broadcasting Company (NBC), the leading U.S. television network, brought GE into the broadcasting business in full force. Although both RCA and GE were heavily involved in consumer electronics, the match was regarded by industry analysts as beneficial, because GE had been shifting from manufacturing into service and high technology. After the merger, almost 80 percent of GE's earnings came from services and high technology, compared to 50 percent six years earlier. GE divested itself of RCA's famous David Sarnoff Research Center, because GE's labs made it redundant. In 1987 GE also sold its own and RCA's television manufacturing businesses to the French company Thomson in exchange for Thomson's medical diagnostics business.

GE justified the merger by citing the need for size to compete effectively with large Japanese conglomerates. Critics, however, claimed that GE was running from foreign competition by increasing its defense contracts (to almost 20 percent of its total business) and its service business, both of which were insulated from foreign competition.

In 1986 GE also purchased the Employers Reinsurance Corporation, a financial services company, from Texaco, for $1.1 billion, and an 80 percent interest in Kidder Peabody and Company, an investment banking firm, for $600 million, greatly broadening its financial services division. Although Employer's Reinsurance contributed steadily to GE's bottom line following its purchase, Kidder Peabody lost $48 million in 1987, in part because of the settlement of insider trading charges. Kidder Peabody did come back in 1988 to contribute $46 million in earnings, but the acquisition still troubled some analysts. GE owned 100 percent of Kidder Peabody by 1990.

General Electric's operations were divided into three business groups in the early 1990s: technology, service, and manufacturing. Its manufacturing operations, traditionally the core of the company, accounted for roughly one-third of the company's earnings. Still, GE continued to pour more than $1 billion annually into research and development of manufactured goods. Much of that investment was directed at energy conservation--more efficient light bulbs, jet engines, and electrical power transmission methods, for example.

In 1992 GE signaled its intent to step up overseas activity with the purchase of 50 percent of the European appliance business of Britain's General Electric Company (GEC). The two companies also made agreements related to their medical, power systems, and electrical distribution businesses. Welch said that his aim was to make GE the nation's largest company. To that end, General Electric continued to restructure its existing operations in an effort to become more competitive in all of its businesses. Most importantly, the company launched an aggressive campaign to become dominant in the growing financial services sector.

GE's aggressive initiatives related to financial services reflected the fact that the service sector represented more than three-quarters of the U.S. economy going into the mid-1990s. Furthermore, several service industries, including financial, were growing rapidly. GE's revenues from its giant NBC and GE Capital divisions, for example, rose more than 12 percent annually from about $14.3 billion in 1988 to more than $25 billion in 1994. Encouraged by those gains, GE's merger and acquisition activity intensified. For example, in 1994 the company offered a $2.2 billion bid

appliance operations got a big boost when an enormous manufacturing site, Appliance Park, in Louisville, Kentucky, was completed. The flow of new GE products--hair dryers, skillets, electronic ovens, self-cleaning ovens, electric knives--continued.

Other innovations to come from GE labs during the 1950s included an automatic pilot for jet aircraft, Lexan polycarbonate resin, the first all-transistor radio, jet turbine engines, gas turbines for electrical power generation, and a technique for fabricating diamonds.

Antitrust problems continued to vex the company throughout the postwar years. In 1961 the Justice Department indicted 29 companies, of which GE was the biggest, for price fixing on electrical equipment. All the defendants pleaded guilty. GE's fine was almost half a million dollars, damages it paid to utilities who had purchased price-fixed equipment came to at least $50 million, and three GE managers received jail sentences and several others were forced to leave the company.

During the 1960s and 1970s GE grew in all fields. In 1961 it opened a research center for aerospace projects, and by the end of the decade had more than 6,000 employees involved in 37 projects related to the moon landing. In the 1950s General Electric entered the computer business. This venture, however, proved to be such a drain on the company's profits that GE sold its computer business to Honeywell in 1971.

By the late 1960s, GE's management began to feel that the company had become too large for its existing structures to accommodate. Accordingly, the company instituted a massive organizational restructuring. Under this restructuring program, the number of distinct operating units within the company was cut from more than 200 to 43. Each new section operated in a particular market and was headed by a manager who reported to management just beneath the corporate policy board. The sections were classified into one of three categories--growth, stability, or no-growth--to facilitate divestment of unprofitable units.

When this reorganization was complete, General Electric made what was at the time the largest corporate purchase ever. In December 1976 GE paid $2.2 billion for Utah International, a major coal, copper, uranium, and iron miner and a producer of natural gas and oil. The company did 80 percent of its business in foreign countries. Within a year Utah International was contributing 18 percent of GE's total earnings.

In the meantime, GE scientist Ivar Giaever was a corecipient of the 1973 Nobel Prize in Physics for his discoveries in the area of superconductive tunneling. Giaever became the second GE employee to be honored with a Nobel Prize.

The divestiture of its computer business had left GE without any capacity for manufacturing integrated circuits and the high-technology products in which they are used. In 1975 a study of the company's status concluded that GE, one of the first U.S. electrical companies, had fallen far behind in electronics. As a result, GE spent some $385 million to acquire Intersil, a semiconductor manufacturer; Calma, a producer of computer graphics equipment; and four software producers. The company also spent more than $100 million to expand its microelectronics facilities.

Other fields in which GE excelled were in trouble by the mid-1970s, most notably nuclear power. As plant construction costs skyrocketed and environmental concerns grew, the company's nuclear power division began to lose money. GE's management, however, was convinced that the problem was temporary and that sales would pick up in the future. When by 1980 General Electric had received no new orders for plants in five years, nuclear power began to look more and more like a prime candidate for divestment. GE eventually pulled out of all aspects of the nuclear power business except for providing service and fuel to existing plants and conducting research on nuclear energy.

Though General Electric's growth was tremendous during the 1970s and earnings tripled between 1971 and 1981, the company's stock performance was mediocre. GE had become so large and was involved in so many activities that some regarded its fortunes as capable only of following the fortunes of the country as a whole.

1981-2001: The Jack Welch Era

GE's economic problems were mirrored by its managerial reshuffling. When John F. (Jack) Welch, Jr., became chairman and CEO in 1981, General Electric entered a period of radical change. Over the next several years, GE

for Kemper Corp., a diversified insurance and financial services company (it retracted the bid in 1995). GE's sales from services as a percentage of total revenues increased from 30 percent in 1988 to nearly 45 percent in 1994, and neared 60 percent by 1996. The troubled Kidder Peabody unit remained a drag on GE's services operations, leading to the company's late 1994 decision to liquidate the unit. As part of the liquidation, GE sold some Kidder Peabody assets and operations to Paine Webber Group Inc. for $657 million.

In contrast to its service businesses, GE's total manufacturing receipts remained stagnant at about $35 billion. Nevertheless, restructuring was paying off in the form of fat profit margins in many of its major product divisions. Importantly, GE made significant strides with its Aircraft Engine Group. Sales fell from $8 billion in 1991 to less than $6 billion in 1995, but profit margins rose past 18 percent after dipping to just 12 percent in 1993. Reflective of restructuring efforts in other GE divisions, the company accomplished the profit growth by slashing the engineering workforce from 10,000 to 4,000 and reducing its overall Aircraft Engine Group payroll by about 50 percent, among other cost-cutting moves.

Despite a global economic downturn in the early 1990s, GE managed to keep aggregate sales from its technology, service, and manufacturing operations stable at about $60 billion annually. More importantly, net income surged steadily from $3.9 billion in 1989 to $5.9 billion in 1994, excluding losses in the latter year from Kidder Peabody operations. In 1994, in fact, General Electric was the most profitable of the largest 900 U.S. corporations, and was trailed by General Motors, Ford, and Exxon. Revenues reached $70 billion by 1995, the same year that the company's market value exceeded $100 billion for the first time.

The late 1990s saw General Electric reach a number of milestones. In 1996 the company celebrated its 100th year as part of the Dow Jones Index; GE was the only company remaining from the original list. That year, NBC joined with Microsoft Corporation in launching MSNBC, a 24-hour cable television news channel and Internet news service. Overall revenues exceeded the $100 billion mark for the first time in 1998, while the continuing stellar growth at GE Capital led that unit to generate nearly half of GE's revenues by the end of the decade.

Acquisitions in the late 1990s centered on two of the company's growth initiatives: services and globalization. In 1996 the GE Appliances division acquired a 73 percent interest in DAKO S.A., the leading manufacturer of gas ranges in Brazil. GE Capital Services expanded in Japan through the 1996 purchase of an 80 percent stake in Marubeni Car System Co., an auto leasing firm; the 1998 acquisitions of Koei Credit and the consumer finance business of Lake Corporation; and the 1998 formation of GE Edison Life following the purchase of the sales operations of Toho Mutual Life Insurance, which made GE Capital the first foreign company involved in the Japanese life insurance market. In early 1999 GE Capital made its largest deal in Japan to date with the purchase of the leasing business of Japan Leasing Corporation, a business with $7 billion in leasing assets. Then in late 1999 GE Capital agreed to purchase the remaining assets of Toho Mutual for ¥240 billion ($2.33 billion); Toho had collapsed during 1999 after suffering huge losses from the thousands of old, unprofitable policies in its portfolio, and a large portion of its liabilities were to be covered by Japan's life insurance association. Expansion also continued in Europe for GE Capital, highlighted by the 1997 acquisition of Woodchester, one of the largest financial services companies in Ireland. Overall, GE spent some $30 billion during the 1990s in completing more than 130 European acquisitions.

Under Welch's leadership, General Electric in the late 1990s also adopted "six sigma," a quality control and improvement initiative pioneered by Motorola, Inc. and AlliedSignal Inc. The program aimed to cut costs by reducing errors or defects. GE claimed that by 1998 six sigma was yielding $1 billion in annual savings. The company also continued to restructure as necessary, including taking a $2.3 billion charge in late 1997 to close redundant facilities and shift production to cheaper labor markets. During 1999 General Electric adopted a fourth growth initiative, e-business (globalization, services, and six sigma being the other three). Like many longstanding companies, GE reacted cautiously when the Internet began its late 1990s explosion. But once he was convinced of the new medium's potential, Welch quickly adopted e-commerce as a key to the company's future growth. Among the early ventures was a plan to begin selling appliances through Home Depot, Inc.'s web site, a move aimed at revitalizing lagging appliance sales.

In late 1999 Welch announced that he planned to retire in April 2001, but he did not name a successor. At the time, General Electric was one of the world's fastest growing and most profitable companies, and boasted a market capitalization of $505 billion, second only to Microsoft Corporation. Revenues for 1999 increased 11 percent to $111.63 billion while net income rose 15 percent to $10.72 billion. These figures also represented huge gains since Welch took over in 1981, when the company posted profits of $1.6 billion on sales of $27.2 billion.

Welch was not done yet, however. In October 2000 he swooped in to break up a planned $40 billion merger of United Technologies Corporation and Honeywell International Inc. The Honeywell board accepted GE's $45 billion bid, which was set to be the largest acquisition in the company's history. Honeywell was coveted for its aerospace unit, a $9.9 billion business involved in flight-control systems, onboard environmental controls, and repair services. The addition of this unit was expected to significantly boost the GE Aircraft Engines unit, creating a global aerospace giant. Welch agreed to stay on at General Electric through the end of 2001 in order to see the acquisition through to fruition. He did, however, name a successor soon after this deal was announced. In November 2000 Jeffrey R. Immelt won the succession battle and was named president and chairman-elect. Immelt, who joined GE in 1982, had most recently served as president and CEO of GE Medical Systems, a unit with revenues of $12 billion. Immelt's two chief rivals in the race to become only the ninth CEO in GE's long history, W. James McNerney Jr., head of GE Aircraft Engines, and Robert L. Nardelli, head of GE Power Systems, soon left the company to become CEOs of 3M Company and Home Depot, respectively.

Rather than serving as a capstone for a much admired reign of leadership, the Honeywell deal instead provided a sour ending for the Welch era. In the summer of 2001 the European Commission blocked the deal on antitrust grounds as 11th-hour negotiations between the European regulators and GE executives broke down. Welch finally retired soon thereafter, with Immelt taking over as chairman and CEO in September 2001.

The Immelt Era: 2001 and Beyond

Meanwhile, one last major deal was initiated prior to the leadership handover. In July 2001 General Electric's GE Capital unit agreed to pay $5.3 billion for Heller Financial Inc., a global commercial finance company based in Chicago that had total assets of about $19.5 billion. This deal, the second largest in GE history, behind only the 1986 deal for RCA, was consummated in October 2001. Also during 2001, GE Lighting had the largest product launch in its history when it introduced the GE Reveal line of light bulbs, which were touted as providing "a cleaner, crisper light" because the bulbs filtered out the duller yellow rays commonly produced by standard incandescent light bulbs. GE began feeling the effects of the economic downturn that year as revenues fell nearly 3 percent, to $125.68 billion; profits nevertheless increased 7.5 percent, reaching $13.68 billion, though that was a far cry from the yearly 13 to 15 percent increases that Wall Street came to expect from GE during the Welch era.

Immelt began to place his imprint in earnest on GE in 2002 through major restructurings and several significant acquisitions. Midyear he launched a reorganization of GE Capital. The financial services unit was divided into four separate units to streamline management, increase oversight, and improve transparency. The new units were: GE Commercial Finance, GE Consumer Finance, GE Equipment Management (involved in equipment leasing and loans), and GE Insurance. Also during 2002, the GE Appliances and GE Lighting units were combined into a new GE Consumer Products unit. On the acquisitions front, NBC widened its media holdings through the April 2002 acquisition of Hialeah, Florida-based Telemundo Communications Group Inc. for $2.7 billion and the $1.25 billion purchase of the Bravo cable network, completed in December of that year. Telemundo owned the second largest Spanish-language television network, as well as nine U.S. TV stations and the leading TV station in Puerto Rico. NBC hoped to tap into the growing Hispanic market via the deal. Bravo was known for its intelligent, arts-oriented programming such as *Inside the Actors Studio,* and it provided NBC with its first entertainment-oriented cable property. Also during 2002, GE Specialty Materials acquired BetzDearborn, a leading maker of water treatment chemicals, from Hercules Inc. for $1.8 billion. In addition, GE Industrial Systems spent about $777 million for Interlogix, Inc, an Austin, Texas-based manufacturer of electronic security products and systems for commercial, industrial, and residential use. All told, General Electric spent approximately $9 billion on industrial acquisitions alone during 2002. Concerns about whether the company could continue its stellar earnings performance and about its accounting practices sent GE's stock sharply lower in 2002. The stock ended the year trading at $24.35 per share, less than half of the high price for 2001. Once again, profits rose modestly, to $14.12 billion, or about 3 percent.

Taking advantage of the economic downturn to acquire desirable assets from distressed sellers, GE's deal-making appetite grew only larger in 2003. That year was the company's biggest acquisition year yet, with deals worth a collective $30 billion either completed or announced. In August the company agreed to buy Transamerica Finance Corporation's commercial lending business from Aegon N.V. of The Netherlands for $5.4 billion. The deal, which added about $8.5 billion in assets to the GE Commercial Finance unit, closed in January 2004. Also during the summer of 2003 GE sold three of its slower growing insurance businesses: Financial Guaranty Insurance Co., Tokyo-based GE Edison Life Insurance Co., and GE's U.S.-based auto and homeowners insurance unit. About $4.5 billion was raised through these divestments.

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As part of its effort to shift emphasis to higher growth fields, General Electric completed two significant acquisitions in healthcare. In October 2003, Instrumentarium Corp. was acquired for $2.3 billion. Based in Finland, Instrumentarium was a major medical-equipment maker with a product line that featured devices for anesthesia, critical care, and patient monitoring. That same month, GE agreed to buy Amersham plc, a British firm specializing in diagnostics agents used during scans of the body for disease, gene-sequencing tools, and protein separation for high-tech drug development. Consummated in April 2004 and valued at about $9.5 billion, the purchase of Amersham stood, very briefly, as the largest acquisition in General Electric history. Following the Amersham acquisition, GE Medical Systems, now a $14 billion business, was renamed GE Healthcare. Based in the United Kingdom--the first GE unit to be headquartered outside the United States--GE Healthcare was headed by Amersham's former chief executive, William Castell; Castell was also named a GE vice-chairman, the first outsider to be so named.

Meanwhile, also in October 2003, General Electric announced an even larger deal, a $14 billion acquisition of Vivendi Universal Entertainment (VUE), the U.S. unit of the French group Vivendi Universal S.A. Among VUE's assets were the Universal Pictures movie studio, the specialty film unit Focus Features, the Universal Television production outfit, cable channels USA Network and Sci-Fi Channel, and theme parks in California, Florida, Japan, and Spain. Upon completion of the deal in May 2004, NBC was merged with VUE to form NBC Universal, which was 80 percent owned by GE and 20 percent by Vivendi. This expansion into entertainment content mimicked earlier combinations involving the ABC and CBS television networks.

Continuing his transformative leadership, Immelt reorganized GE's 13 business units into 11 focused on specific markets and customers. The reorganization, effective at the beginning of 2004, brought similar businesses together in an effort to increase sales and cut costs. The most significant of the changes included combining the firm's aircraft engines business and its rail-related operations in a new GE Transportation unit; merging most of GE Industrial Systems with GE Consumer Products to form GE Consumer & Industrial, which focused on lighting products, appliances, and integrated industrial equipment, systems, and services; and forming GE Infrastructure from certain operations of GE Industrial Systems and GE Specialty Materials. Also in January 2004, GE continued disposing of its insurance operations. That month, General Electric launched an initial public offering (IPO) of about one-third of the stock of the newly formed Genworth Financial, Inc., which consisted of the bulk of GE's life and mortgage insurance businesses. The IPO was planned for completion by mid-2004, after which GE planned to make Genworth fully independent within three years. What was left of GE Insurance was mainly its reinsurance business, which was long rumored to be another candidate for divestment.

Overall, through the myriad moves engineered during just a few years in charge, Immelt was seeking to cut General Electric's reliance on financial services and mature industrial businesses in favor of such higher growth areas as healthcare and entertainment. He was also building operations in fast-growing economies such as China's. By 2005, GE was aiming to outsource $5 billion of parts and services from China and simultaneously grow sales in China to a like figure. Further divestments were also expected, and there had long been speculation that the slow-growing lighting and appliances businesses were prime candidates. Through initiatives such as these, Immelt hoped to return General Electric to double-digit earnings growth by 2005.

Principal Subsidiaries: American Silicones, Inc.; Bently Nevada, LLC; Caribe GE International Electric Meters Corp. (Puerto Rico); Cardinal Cogen, Inc.; Datex-Ohmeda, Inc.; Elano Corporation; GEAE Technology, Inc.; GE CGR Europe (France); GE Drives and Controls, Inc.; GE Druck Holdings Limited; GE Electric Canada, Inc.; GE Energy Europe, BV (Netherlands); GE Energy Parts Inc.; GE Energy Products, Inc.; GE Energy Services, Inc.; GE Energy Services-Dallas, LP; GE Engine Services Distribution, LLC; GE Engine Services, Inc.; GE Fanuc Automation Corporation (50%); GE Gas Turbines (Greenville) L.L.C.; GE Hungary Co., Ltd.; GE Interlogix, Inc.; GE Investment, Inc.; GE Keppel Energy Services Pte., Inc. (Singapore); GE Medical Global Technology Co., LLC; GE Medical Systems Information Technologies, Inc.; GE Medical Systems, Inc.; GE Packaged Power L.P.; GE Petrochemicals, Inc.; GE Plastic Finishing, Inc.; GE Plastics España ScPA (Spain & Canary Islands, Balearic Island); GE Plastics Pacific Pte. Ltd. (Singapore); GE Polymerland, Inc.; GE Power Systems Licensing Inc.; GE Quartz, Inc.; GE Silicones WV, LLC; GE Superabrasives, Inc.; GE Transportation Parts, LLC; GE Transportation Services, LLC; GE Transportation Systems Global Signaling, LLC; GEA Products LP; General Electric International (Benelux) BV (Netherlands); General Electric International, Inc.; Granite Services, Inc.; National Broadcasting Company; Nuclear Fuel Holding Co., Inc.; Nuovo Pignone Holding S.p.A. (Italy); OEC Medical Systems Inc.; PII Limited (U.K.); Reuter-Stokes, Inc.; Sensing Solutions, Inc.; Viceroy, Inc.; General Electric Capital Services, Inc.; General Electric Capital Corporation; GE Global Insurance Holding Corporation.

Principal Operating Units: GE Advanced Materials; GE Commercial Finance; GE Consumer Finance; GE Consumer & Industrial; GE Energy; GE Equipment Services; GE Healthcare; GE Infrastructure; GE Insurance; GE Transportation; NBC Universal (80%).

Principal Competitors: ABB Ltd.; ALSTOM; American International Group, Inc.; AREVA Group; BASF Aktiengesellschaft; CIGNA Corporation; CIT Group Inc.; Citigroup Inc.; AB Electrolux; General Motors Corporation; General Re Corporation; Halliburton Company; Honeywell International Inc.; Household International, Inc.; J.P. Morgan Chase & Co.; Matsushita Electric Industrial Co., Ltd.; Maytag Corporation; MBNA Corporation; The News Corporation Limited; Robert Bosch GmbH; Rolls-Royce plc; Royal Philips Electronics N.V.; Siemens AG; Time Warner Inc.; Toshiba Corporation; Tyco International Ltd.; United Technologies Corporation; Viacom Inc.; The Walt Disney Company; Whirlpool Corporation.

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